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Multifunction plate for surface cleaner

The invention relates to a multifunction plate for a surface cleaner.

5 This plate serves as a support, for example, for a woven or non-woven textile cover that is used to clean and rub surfaces ; the plate is mounted on the end of a sleeve, stick or handle, advantageously with the help of a spherical joint, as seen, in particular, in document US-A 4,070,726. Said flexible piece of
10 textile has to be fixed to this support removably so that it can easily be replaced and wrung out, and it must be held firmly thereon.

There is a known solution which consists in producing a cover formed of a rectangular base, the two short sides of which are folded to constitute fixing pockets designed to cap the ends of the support, which support is formed in two half-portions pivoting about a pin to enable the support to be introduced into the textile pocket and to be extracted therefrom.

Other systems for holding a textile on a support take the form of flexible pieces, of the towel holder type, for example, disposed on top of the plate, and the textile, which is folded back on its four sides is thus held so as to envelop its support, as, for example in document US-A 4 852 210.

25 There also exist support plate type devices capable of receiving elasticated covers but, to position them, the plate is usually of a trapezoidal shape.

Finally, more simply, it is known to be possible to fix to the base of a support a textile strip on which can be mounted a self-gripping textile panel.

30 Each of these fixing methods thus necessitates a support of
a particular type that is adapted thereto, and these different
systems are not always very easy to handle.

The invention offers a novel solution to these difficulties thanks to a general-purpose plate, capable of receiving all types of surface cleaner, it being easier, moreover, for the user to replace and fix them.

Abstract. We study the asymptotic behavior of the eigenvalues of the Dirac operator $D_{\mathbb{H}^n}$ on the hyperbolic space \mathbb{H}^n with a constant magnetic field. The asymptotic behavior of the eigenvalues is determined by the asymptotic behavior of the eigenvalues of the Dirac operator $D_{\mathbb{H}^n}$ on the hyperbolic space \mathbb{H}^n with a constant magnetic field. The asymptotic behavior of the eigenvalues is determined by the asymptotic behavior of the eigenvalues of the Dirac operator $D_{\mathbb{H}^n}$ on the hyperbolic space \mathbb{H}^n with a constant magnetic field.

The invention thus relates to a multifunction plate for a surface cleaner that is constituted by a plate of a generally rectangular shape, provided with gripping and manipulating means, as well as with means for securing pieces of textile, said gripping and manipulating means, between, on one hand, the broom-stick or the holding handle and, on the other hand, a central rod connected to the plate, being interchangeable, and a plurality of means for fixing different types of pieces of textile being provided, said means being :

- 10 - on the lower base of the plate, plane portions for self-gripping strips ;
- on the upper face of the plate, at least clamping mechanisms co-operating with windows or cavities in the plate to hold all types of pieces having turned-back edges, and holes
- 15 suitable for press stud systems for fixing clips.

According to a first main feature of the invention, the interchangeable gripping and handling means include a joint pivoting on the rod which is equipped with two flexible strips for detaching the stick or the handle from the plate.

- 20 According to another special feature of the invention, the clamping mechanism is constituted by a specially shaped strip co-operating with at least a central window and two lateral cavities provided on the upper face of the plate, the strip being shaped to form an arch , the ends of the lateral wings of which
- 25 are placed in the cavities, a system for clipping the strip in the central window being provided in the centre of the strip.

Further special features and advantages of the invention will emerge from the following description of exemplary forms of embodiment, with reference to the annexed drawings, in which :

- 30 - Figs. 1 and 2 are perspective views of the upper face and of the lower face, respectively, of the multifunction plate ;
- Fig. 3 is a perspective view of a clamping strip ;
- Figs. 4 and 5 are a cross-sectional view and a front view,
- 35 respectively, of a system for clipping a broom-stick (left-hand portion) or a handle (right-hand portion) ;

- Figs. 6, 7 and 8 present a cross-sectional view and perspective views, respectively, of an alternative embodiment of a specially shaped pin and of a joint ;

- Fig. 9 is a schematic cross-sectional view of a sponge support means ;

- Figs. 10a and 11 are cross-sectional and top views, respectively, of an alternative embodiment of the clamping strip ;

- Fig. 10b is a cross-sectional view of an alternative embodiment of a pinching type clamping system.

An oval hole 16 passes through plate 1 at each end. Between the hole and the neighbouring heel 4, the upper face 3 of the plate has a central window 9 and two lateral cavities 10 which, in the case illustrated, have a rectangular profile.

The window and the cavities thus equipping the upper face of the plate, on either side of heels 4, serve to position a clamping mechanism constituted by a strip 11, shown in figure 3. This strip, which is advantageously made of plastic, is shaped to form an arch, and the lower faces of the ends of its lateral wings 12 are provided with projections 13 designed to fit into cavities 10. Two resilient bars 14 ending in toes 15 extend perpendicularly to the central portion of the strip, on its concave side. By pinching the bars, it is easy to introduce them into central window 9. Thanks to toes 15, the clamping bar can be clipped onto the upper face of plate 1. Owing to the elasticity of the strip, end projections 13 exert a certain pressure on the

plate, which makes it easy to hold the flaps of a textile cover of any type, with the rectangular plate thus making it possible to receive surface cleaners of any cut.

It is extremely simple to handle the clamping strip, and each one can further be mounted in any direction, on one or the other of the ends of the plate.

In addition, central rod 5, between the two heels 4, makes it possible to remove rapidly a conventional spherical joint for a broom-stick, or again a simple handle, when it is wished to use the plate without its broom-stick.

Figs. 4 and 5 show, precisely, a system for the simple clipping of a broom-stick 17 (left-hand portion) or a holding handle 18 (right-hand portion), onto said central rod 5. The clipping system uses, between the broom-stick or the handle and the rod, a joint 19 pivotally mounted on rod 5, which is equipped, at its centre, with two flexible strips 20 capable of being brought towards one another by pinching in the area of base 21 of the strips to detach the broom-stick or the handle from the joint. In their central portions, strips 20 bear toes 22 capable of sliding in positioning guides 23, which form part of a sleeve 24 for supporting broom-stick 17 or handle 18. It will be appreciated, upon referring to Fig. 6, that pinching the strips at their base 21 causes toes 22 to escape from guides 23, which makes for quick interchange between the two holding devices.

Fig. 5b shows an alternative embodiment of joint 19, the outer border of which is provided with small clipping toes 35 enabling the handle or the broom-stick to be locked in storage position. Advantageously, opposite each toe, a hole 36 is provided in the wall of the joint, which increases the flexibility of the latter and makes it easier to accommodate snap fastening onto the toe.

According to yet another alternative, simplified, embodiment, not shown, of the gripping and manipulating means of the plate, there is provided a threaded socket, fixedly snap fastened to the joint, onto which socket is screwed either the broom-stick or the handle. It is also possible to have a handle

Hands
Sleeve
Two flanges
Joint

that forms the socket itself, which is snap fastened, and to which the broom-stick can be screwed.

Similarly, a handle (or broom-stick) connection can be provided that is fixed in relation to the plate for use after the fashion of a « taloche », or again a connection can be provided with one possible rotation about the axis or two possible rotations about the axis and the joint.

According to another alternative embodiment, illustrated in figures 6, 7 and 8, fixed central rod 5 is replaced by a specially shaped pin 29 that can be displaced longitudinally in relation to plate 1, between the two heels 4, the pin being return biased by a spring 25. It will be noted from Fig. 8 that the pin is proved with flats 25, orientated vertically in relation to the upper face of the plate. A joint 27, shown in figure 7, is specially shaped at its lower portion and is provided with cut-out portions 28, spaced apart like flats 26. To fit the plate onto pin 29, it suffices to move the latter against the bias of spring 25 so that the flats are located opposite the cut-out portions and then, once the joint is in place, the pin is released and moves, biased by the spring, to lock the plate. Joint 27, as in the preceding case, serves as a support for a broom-stick or a holding handle. In one alternative embodiment, not shown, use could be made of a clip-on pin in place of the specially shaped pin.

Even more simply, it could be contemplated using a fixed handle that could be directly clipped onto central rod 5 of the plate.

It can thus be seen that the multifunction properties of the plate apply not only to the fixing of the pieces of textile but also to that of its gripping and handling means.

As to the pieces designed for cleaning properly speaking, fitted onto the multifunction plate, apart from the clamping system described earlier with reference to Fig. 3, it is also possible to take advantage of self-gripping strips 8 to fix a habitually used rectangular cleaning pad directly to the plate.

Finally, the two oval holes 16 can receive a conventional press stud for a cover equipped with corresponding fixing clips.

The oval shape of the holes makes it easier to insert the press stud, and the larger axis of the oval hole is advantageously orientated longitudinally of the plate. Alternatively, the holes could also be square, hexagonal or of any shape that is not perfectly circular as is a press stud.

To facilitate the introduction of the press stud, arrangements can be made to provide, on at least one side, one or two walls that are easily deformable, in a preferential direction, so as to reduce the effort that the user has to make in order to clip the press stud into the plate or to unclip it therefrom. The flexibility of the structure thus obtained further makes the useful life of the product dependable. In rest condition, the dimension of the hole along the longitudinal axis of the plate is greater than the diameter of the metal press stud, the perpendicular dimension being smaller than said diameter.

Upon fitting, the walls are deformed until the dimension of the hole is equal to the diameter of the press stud, and then these walls close together, at the same time exerting a force on the press stud to ensure that the textile cover is securely held in place during use.

This procedure remains valid in the case of a polygonal hole.

These holes, which pass right through plate 1, also serve to clip a sponge support 30, such as the one illustrated in Fig. 9, under lower base 6 of the plate.

Finally, Figs. 10a and 11 illustrate an alternative embodiment of clamping strip 11 shown in Fig. 3. In this alternative embodiment, strip 11 has a central cut-out portion 31, framed by two flexible longitudinal borders 32. Two rigid levers 33 extend into the cut-out portion from the ends of the strip, in the vicinity of projections 13. Under each lever, substantially in the middle thereof, is provided a small rib 34 which extends slightly below the plane formed by borders 32. Finally, beneath each border 32, there are two small resilient bars 14, which are designed to penetrate two adjacent central windows 9 (instead of the single window shown in figure 1) of plate 1, to lock the clamping strip. When the latter is in place on

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